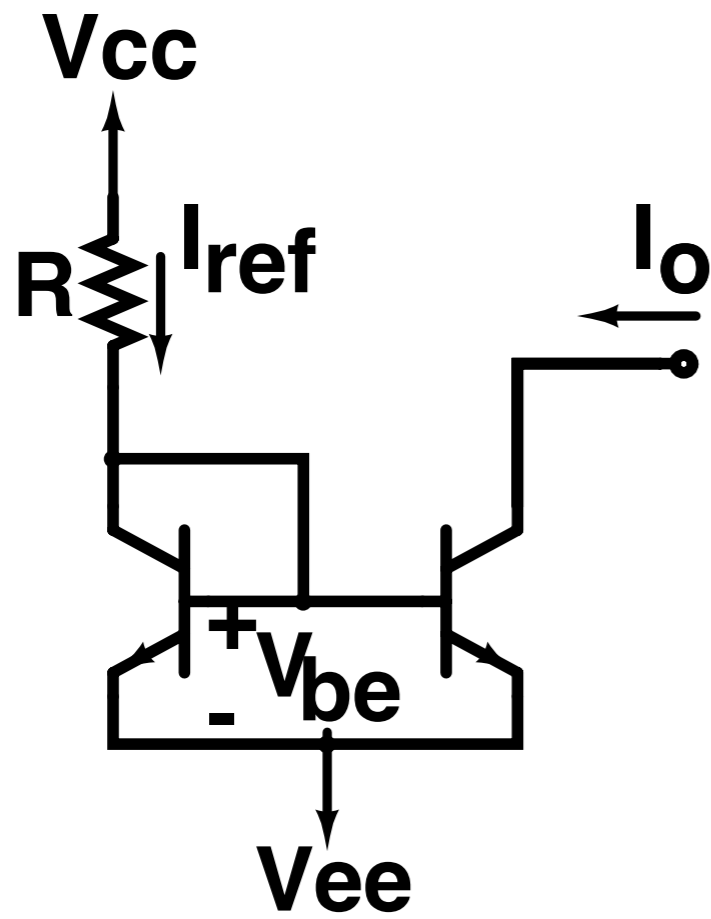
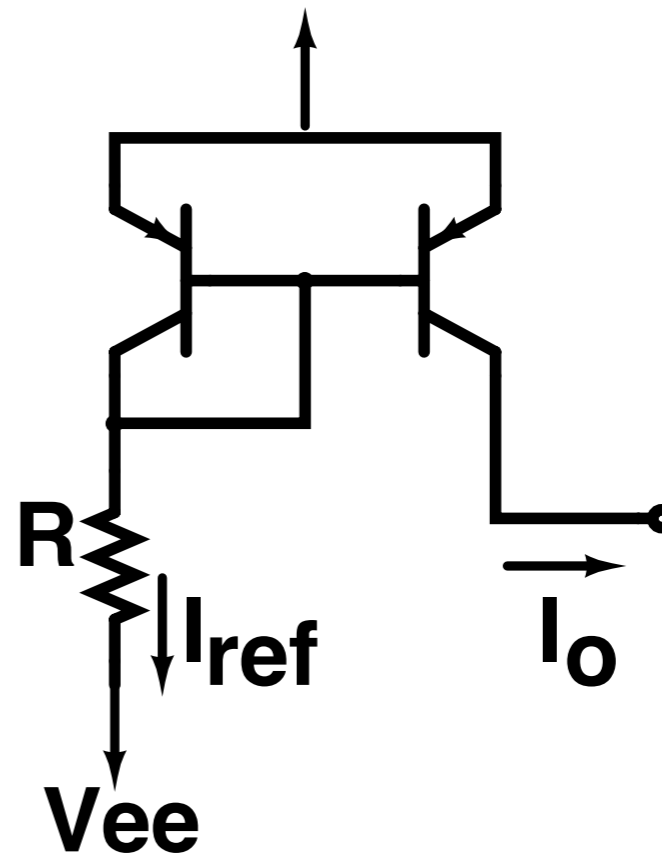


Current Sources & Active Loads

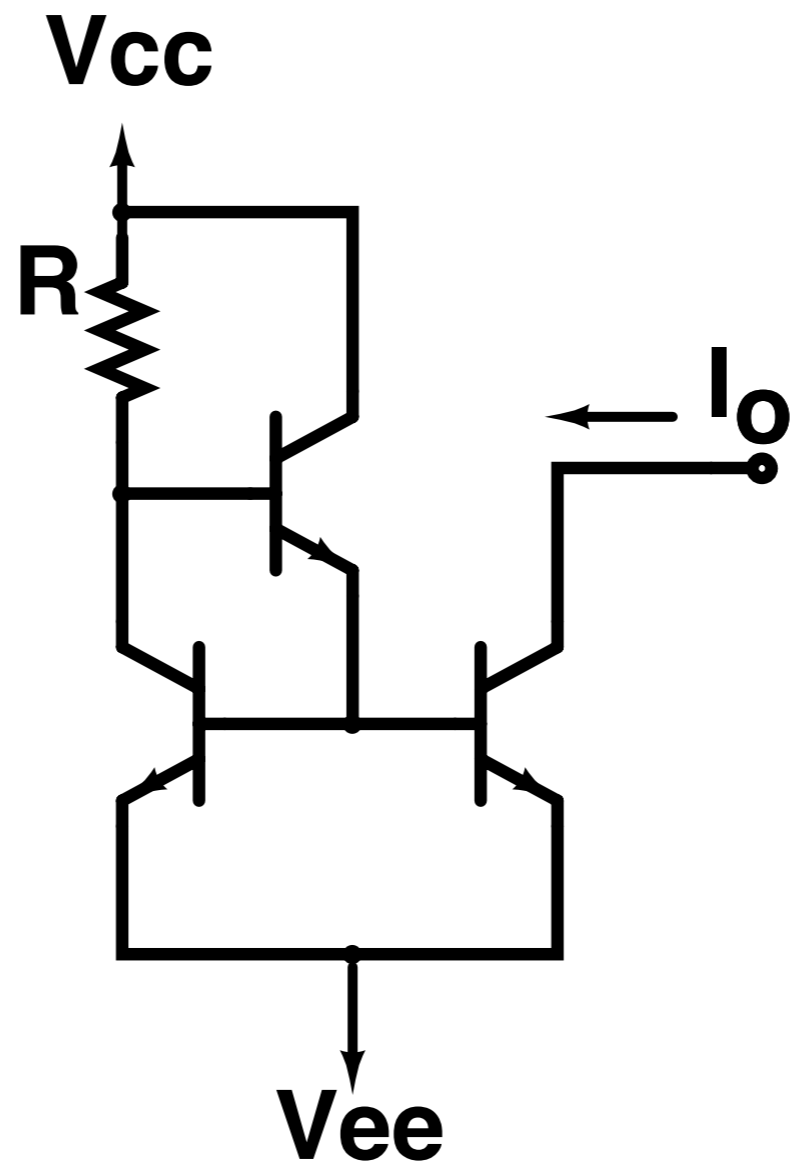
INEL 4202 - Electronics II - Fall 2009



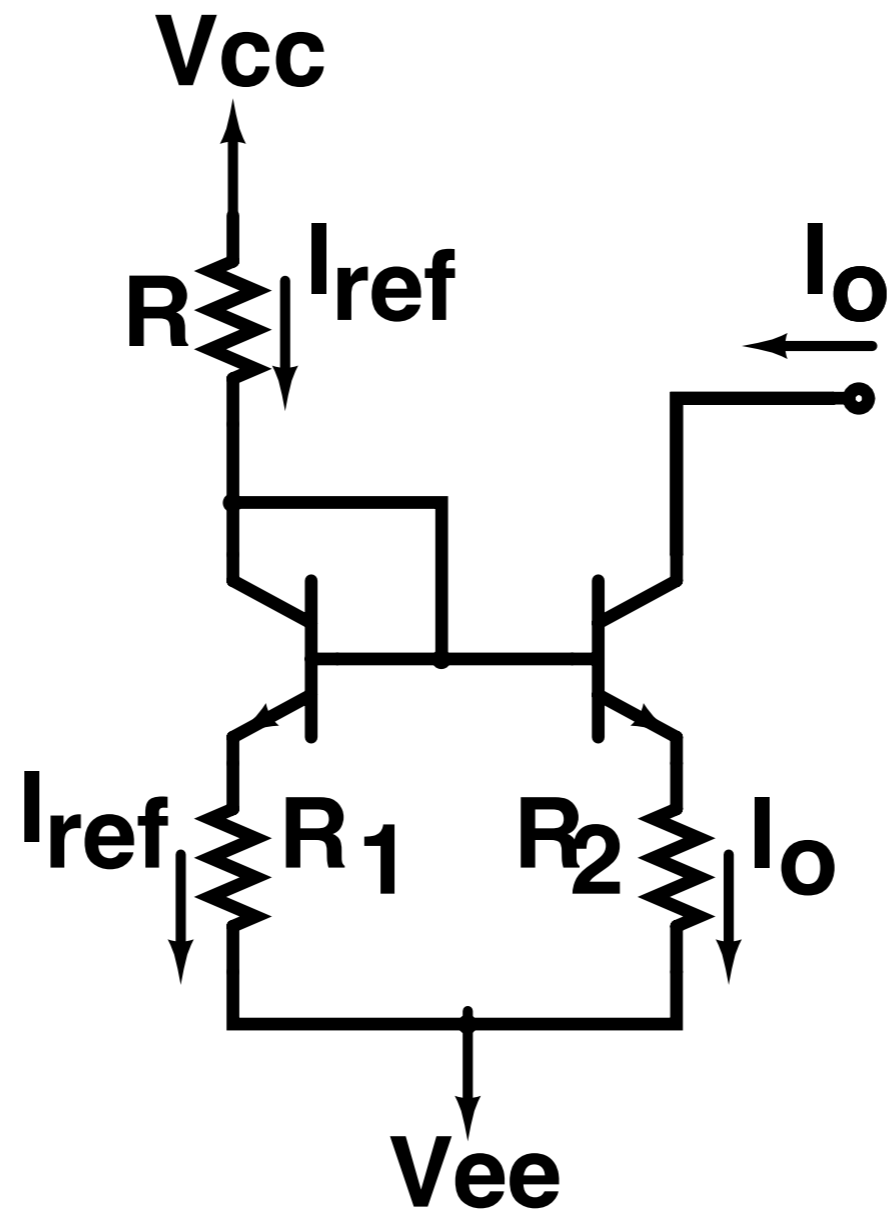
Basic C.S.



Basic C.S. with PNP BJTs

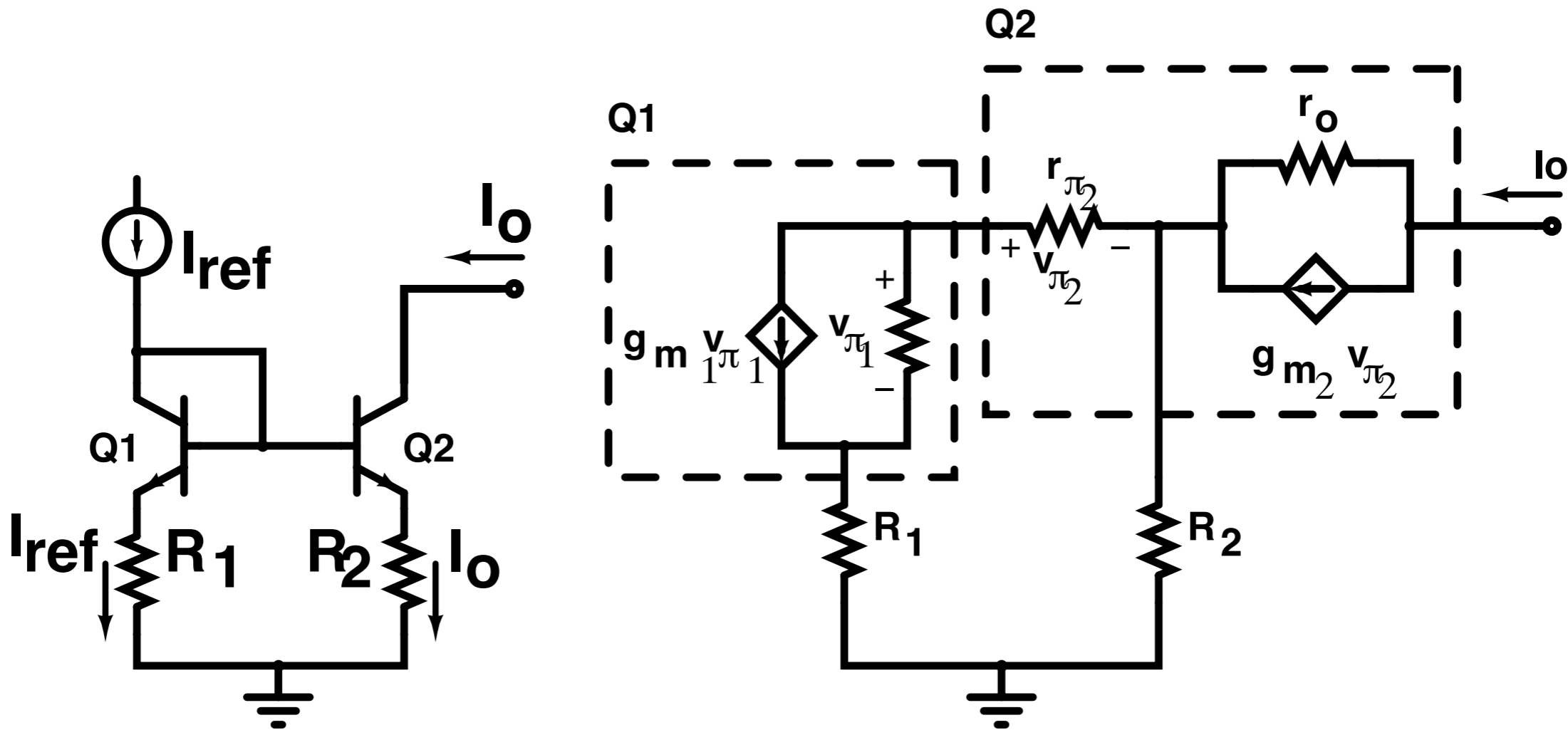


**Mirror with base-current
compensation**



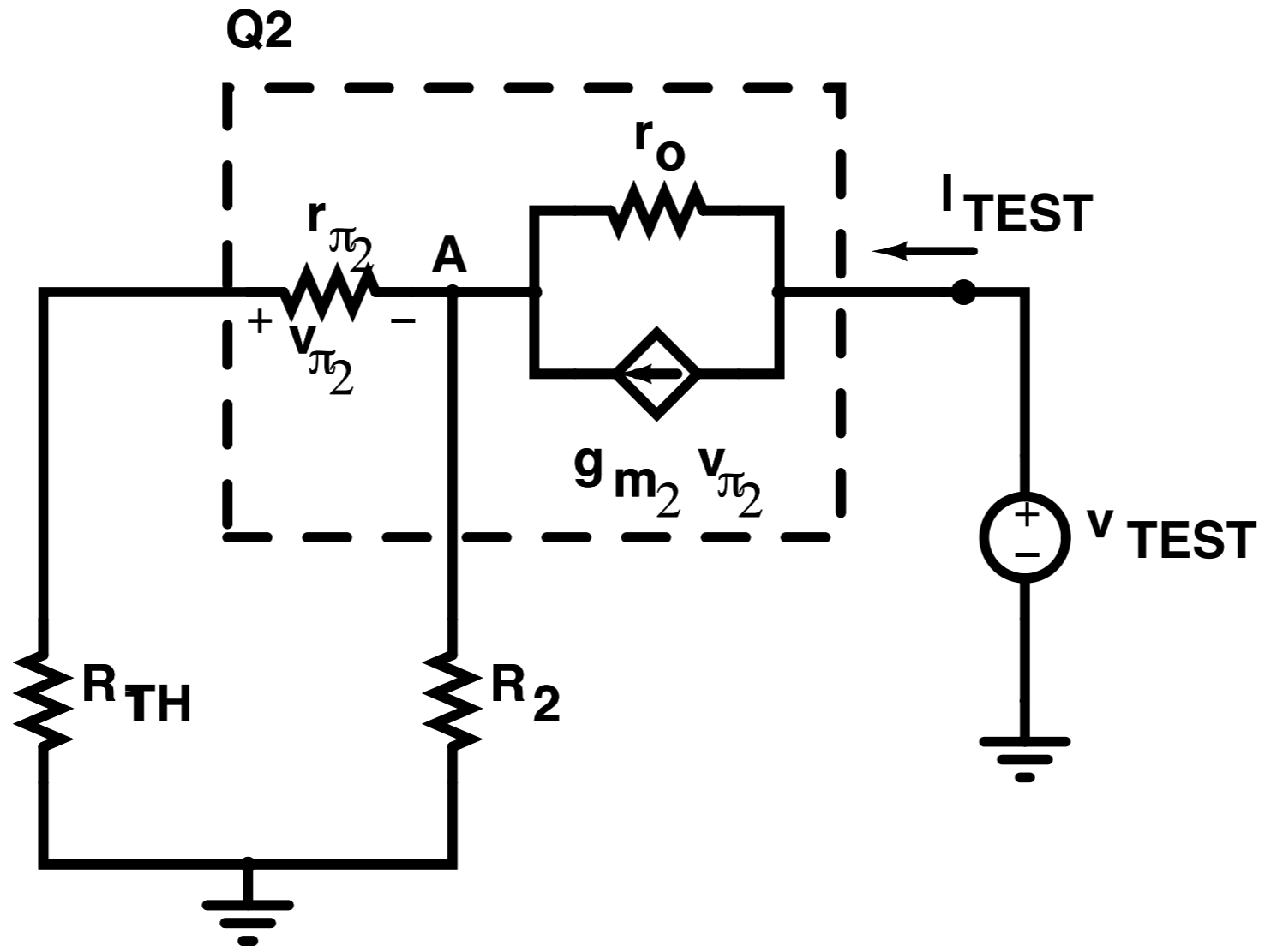
**Basic Source with
Emitter Resistors**

Output Resistance

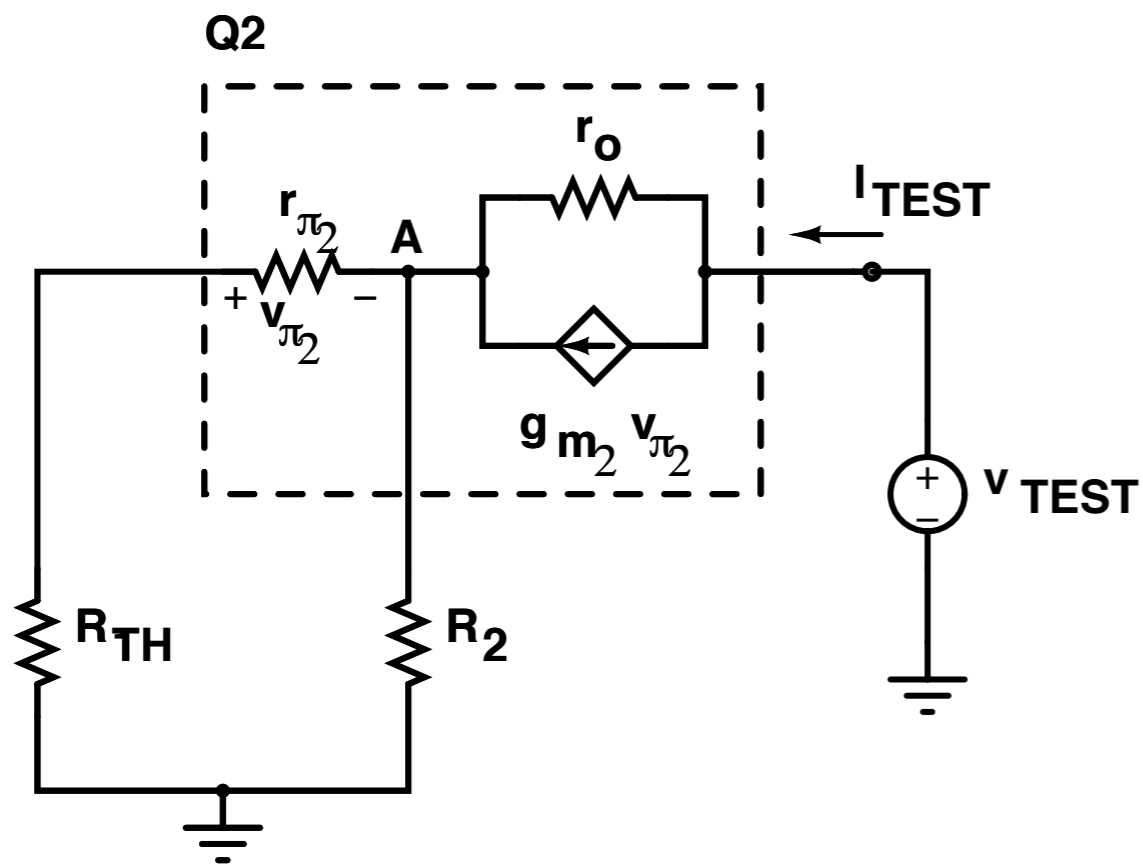


Mirror with emitter resistors

small-signal equivalent circuit

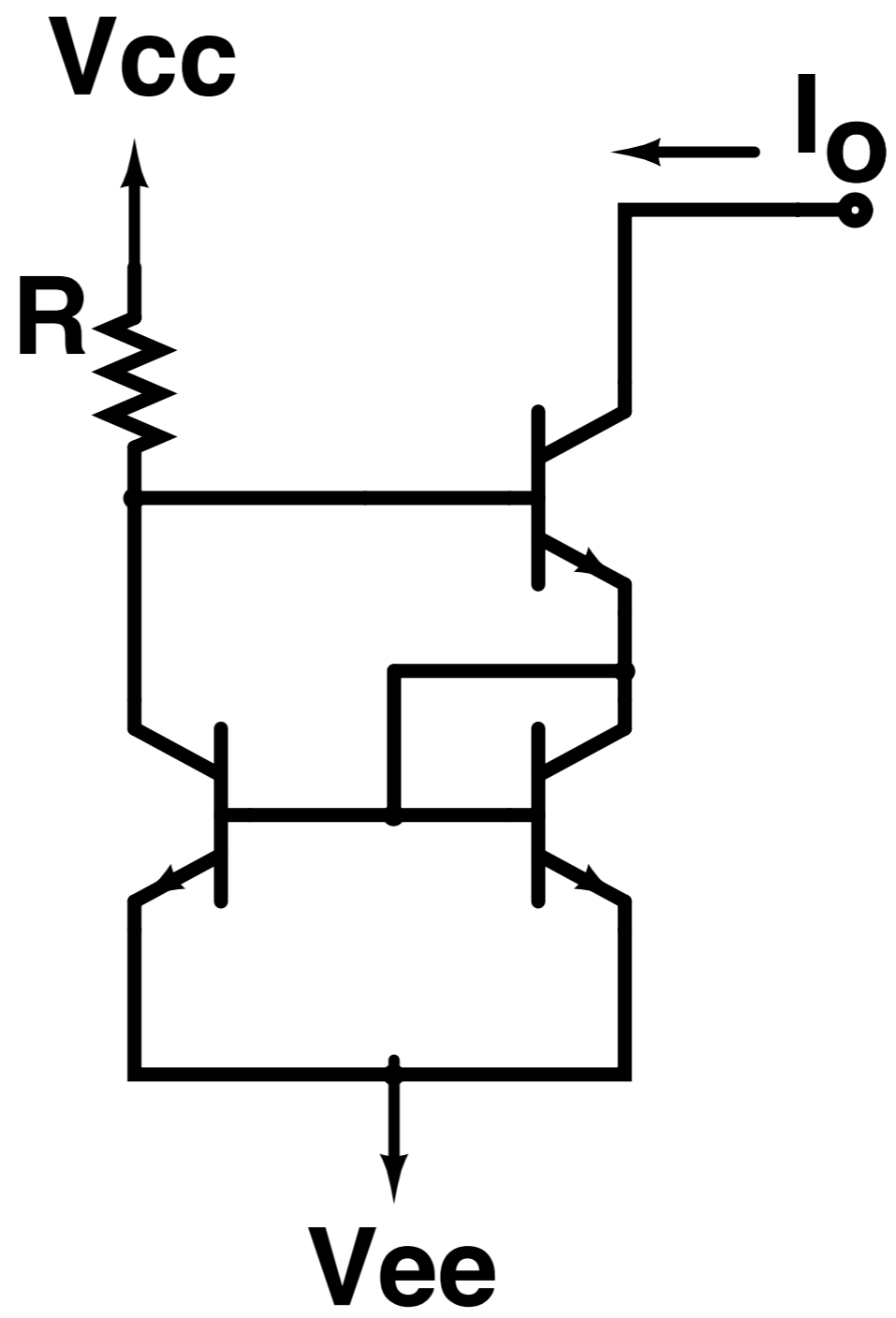


Mirror's Output Resistance



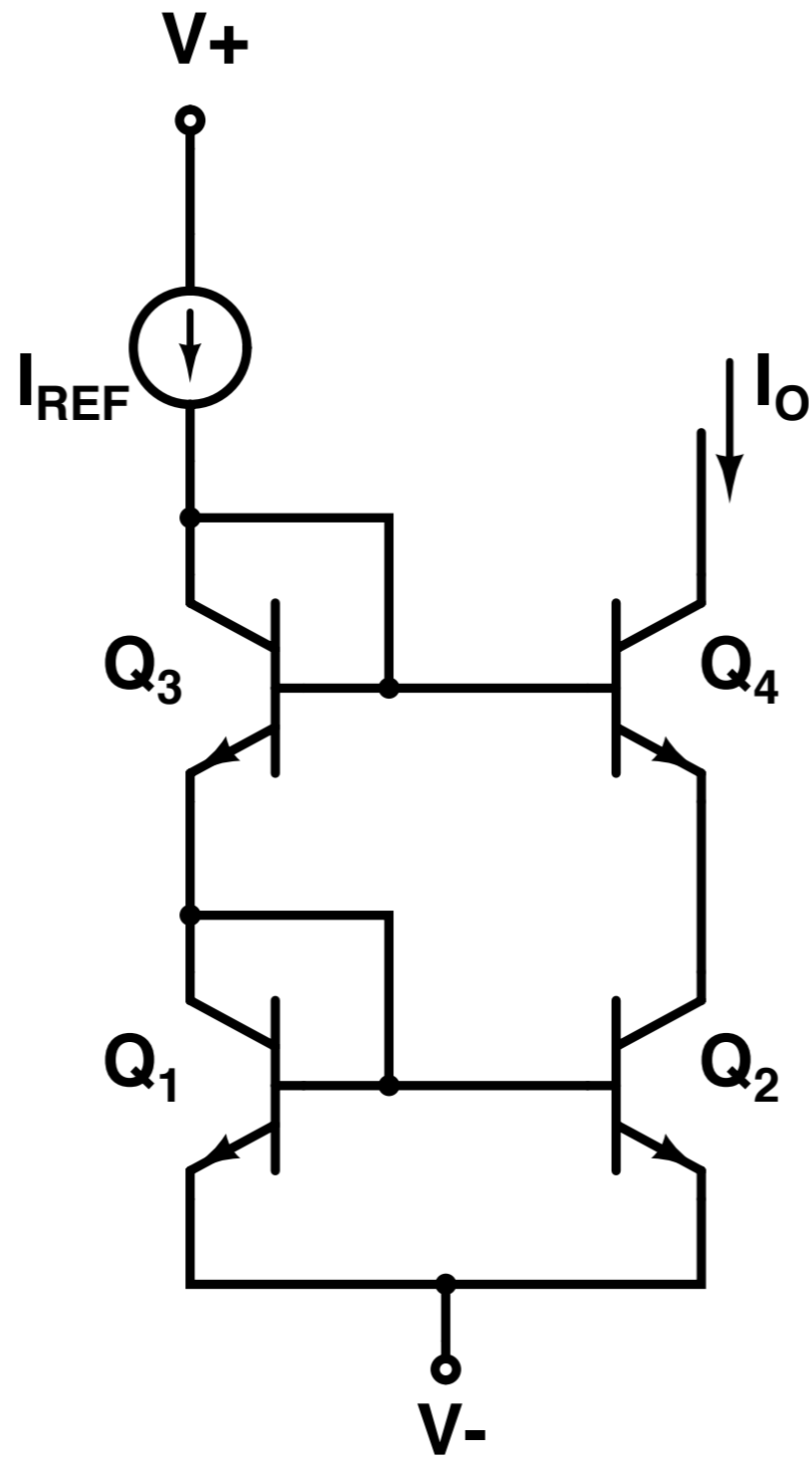
$$R_{TH} = R_1 + 1/g_{m1}$$

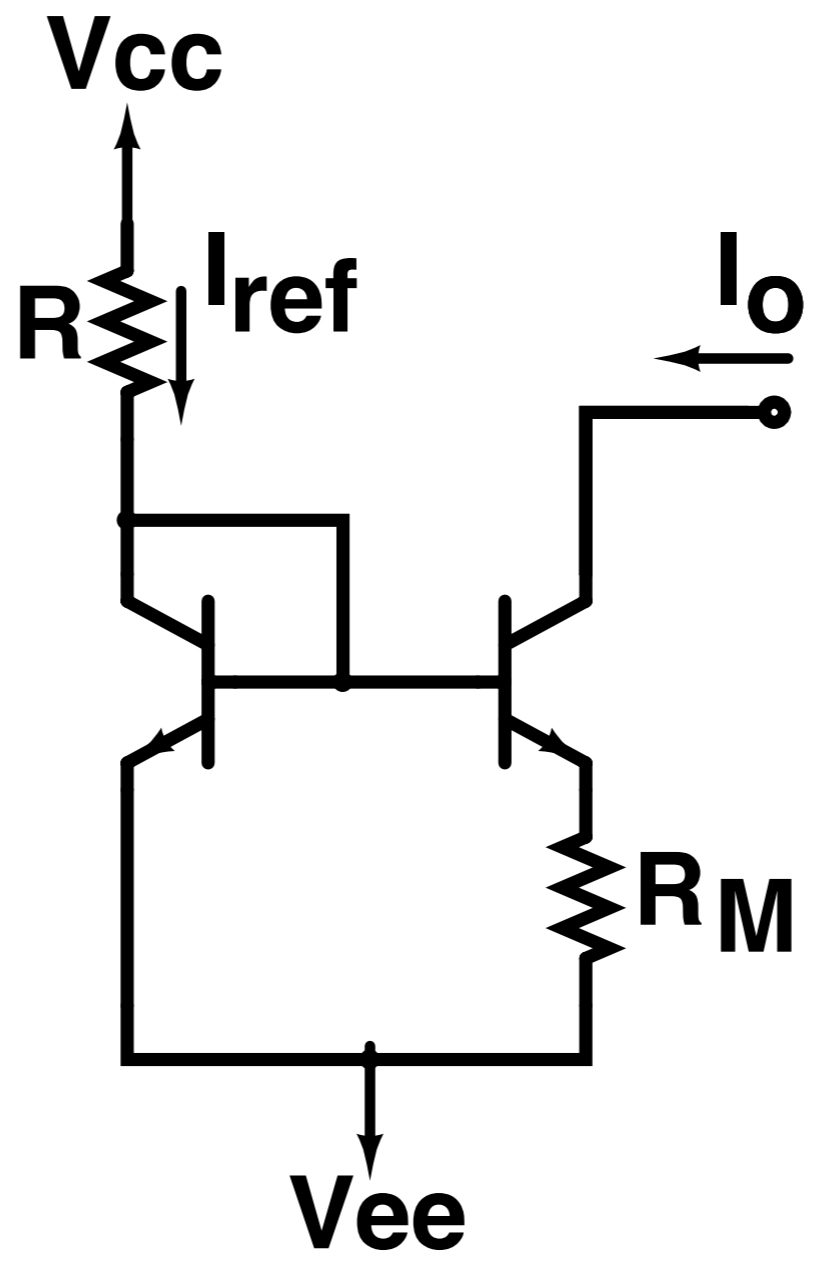
$$R_{OUT} = r_o(1 + g_{m2}R_2)$$



Wilson C.S.

Cascode C.S.





Widlar C.S.

With MOSFETs

